**Supplementary information for**

Digital access constraints predict worse mental health among adolescents during COVID-19

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Chart

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Fig. S1. Sensitivity check: latent growth curve model of youth SDQ Total Difficulties scores, grouped by computer access, including sociodemographic control variables and without excluding participants with no longitudinal weight for COVID-19 wave 8.

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Fig. S2. Sensitivity check: latent growth curve model of youth SDQ Total Difficulties scores, grouped by access to a good internet connection, including sociodemographic control variables and without excluding participants with no longitudinal weight for COVID-19 wave 8.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Wave** | **All** | **Main study wave 9** | | **COVID-19 wave 4** | | **COVID-19 wave 6** | | **COVID-19 wave 8** | |
| **SDQ data available** | **All** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** | **Yes** | **No** |
| **Total** | 1387 | 638 | 749 | 818 | 569 | 836 | 551 | 1386 | 1 |
| **Sex** |  |  |  |  |  |  |  |  |  |
| Male | 656 | 314 | 342 | 372 | 284 | 386 | 270 |  |  |
| Female | 731 | 324 | 407 | 446 | 285 | 450 | 281 |  |  |
| Unavailable | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| **Birth year** |  |  |  |  |  |  |  |  |  |
| 2004 | 152 | 129 | 23 | 71 | 81 | 68 | 84 |  |  |
| 2005 | 209 | 171 | 38 | 149 | 60 | 137 | 72 |  |  |
| 2006 | 193 | 167 | 26 | 127 | 66 | 124 | 69 |  |  |
| 2007 | 227 | 130 | 97 | 149 | 78 | 153 | 74 |  |  |
| 2008 | 213 | 41 | 172 | 138 | 75 | 134 | 79 |  |  |
| 2009 | 190 | 0 | 190 | 128 | 62 | 129 | 61 |  |  |
| 2010 | 176 | 0 | 176 | 56 | 120 | 91 | 85 |  |  |
| 2011 | 27 | 0 | 27 | 0 | 27 | 0 | 27 |  |  |
| Unavailable | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| **Ethnicity** |  |  |  |  |  |  |  |  |  |
| White British | 973 | 472 | 501 | 590 | 383 | 592 | 381 |  |  |
| Other White | 32 | 19 | 13 | 16 | 16 | 17 | 15 |  |  |
| Mixed | 135 | 42 | 93 | 81 | 54 | 84 | 51 |  |  |
| Asian | 193 | 87 | 106 | 99 | 94 | 109 | 84 |  |  |
| Black | 34 | 15 | 19 | 20 | 14 | 20 | 14 |  |  |
| Other |  |  |  |  |  |  |  |  |  |
| Unavailable |  |  |  |  |  |  |  |  |  |
| **Mean household income (x, annual)** |  |  |  |  |  |  |  |  |  |
| x < £20,000 | 90 | 54 | 36 | 65 | 25 | 62 | 28 |  |  |
| £20,000 ≤ x < £30,000 | 133 | 112 | 21 | 88 | 45 | 93 | 40 |  |  |
| £30,000 ≤ x < £40,000 | 155 | 134 | 21 | 106 | 49 | 98 | 57 |  |  |
| £40,000 ≤ x < £50,000 | 149 | 124 | 25 | 102 | 47 | 91 | 58 |  |  |
| £50,000 ≤ x | 258 |  |  | 171 | 87 | 167 | 91 |  |  |
| Unavailable | 602 |  |  | 286 | 316 | 325 | 277 |  |  |

Table S1. Characteristics of participants with, and without, SDQ Total Difficulties scores at each wave (COVID-19 wave 8 and certain other data suppressed to protect participant identities). When fitting longitudinal models, missing Total Difficulties scores were imputed using full information maximum likelihood estimation.

Table S2. Model fit statistics for the ungrouped LGM. Decisions on whether to accept or reject each successive model are made using the p­-value from the relevant pairwise likelihood ratio test (LRT).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **No-change** | 8 | 22 101 | 22 133 | 182 |  |  |
| **No-change** | **Linear** | 5 | 21 961 | 22 008 | 34.7 | < 2.2 × 10-16 | \*\*\* |
| **Linear** | **Quadratic** | 1 | 21 934 | 22 002 | 0.16 | 5.7 × 10-7 | \*\*\* |

Table S3. Ungrouped model output with survey weights applied.

|  |  |  |
| --- | --- | --- |
|  | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | |
| Main study wave 9 | 10.32(1.85) | < 0.001 |
| COVID-19 wave 4 | 6.26(0.63) | < 0.001 |
| COVID-19 wave 6 | 9.03(0.71) | < 0.001 |
| COVID-19 wave 8 | 0.91(1.92) | 0.636 |
| **Latent Intercepts** | | |
| Intercept | 10.10(0.15) | < 0.001 |
| Linear coefficient | 1.12(0.14) | < 0.001 |
| Quadratic coefficient | -0.26(0.04) | < 0.001 |
| **Latent Variances** | | |
| Intercept | 20.72(1.97) | < 0.001 |
| Linear coefficient | 7.32(2.29) | 0.001 |
| Quadratic coefficient | 0.57(0.15) | < 0.001 |
| **Latent Covariances** | | |
| Intercept w/Linear coefficient | -0.10(2.08) | 0.962 |
| Intercept w/Quadratic coefficient | -0.42(0.51) | 0.405 |
| Linear coefficient w/Quadratic coefficient | -1.69(0.53) | 0.001 |
| **Fit Indices** | | |
| χ2 | 7.88(1) | 0.005 |
| CFI | 1 |  |
| RMSEA | 0.07 |  |

Table S4. Model fit statistics for model grouped by computer access (no covariates). Model 0 is an unconstrained quadratic model. As before, pairwise LRTs are carried out to determine whether the model with an additional parameter constrained to equality (as demarcated) fits significantly worse than the previous model.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **0** |  | 2 | 15 934 | 16 057 | 5.92 |  |  |
| **0** | **1** | Residual variances | 6 | 15 929 | 16 033 | 8.88 | 0.54 |  |
| **1** | **2** | *y*-intercept | 7 | 15 928 | 16 027 | 9.99 | 0.29 |  |
| **2** | ***3*** | *Linear coefficient* | *8* | *15 930* | *16 024* | *14.2* | *0.0064* | *\*\** |
| **2** | ***4*** | *Quadratic coefficient* | *8* | *15 930* | *16 025* | *14.2* | *0.0035* | *\*\** |
| **2** | **5** | *y*-intercept variance | 8 | 15 927 | 16 021 | 11.0 | 0.31 |  |
| **5** | **6** | Linear coefficient variance | 9 | 15 925 | 16 015 | 11.1 | 0.89 |  |
| **6** | **7** | Quadratic coefficient variance | 10 | 15 924 | 16 009 | 11.8 | 0.40 |  |
| **7** | **8** | *y*-intercept/linear coefficient covariance | 11 | 15 922 | 16 002 | 12.1 | 0.57 |  |
| **8** | **9** | *y*-intercept/quadratic coefficient covariance | 12 | 15 920 | 15 996 | 12.1 | 0.89 |  |
| **9** | ***10*** | *Linear coefficient/quadratic coefficient covariance* | *13* | *15 920* | *15 991* | *14.3* | *0.041* | *\** |

Table S5. Output for model grouped by computer access (no covariates, survey weights applied).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Main study wave 9 | 10.46(2.40) | < 0.001 | 10.46(2.40) | < 0.001 |
| COVID-19 wave 4 | 6.27(0.81) | < 0.001 | 6.27(0.81) | < 0.001 |
| COVID-19 wave 6 | 9.06(0.92) | < 0.001 | 9.06(0.92) | < 0.001 |
| COVID-19 wave 8 | 1.00(2.49) | 0.689 | 1.00(2.49) | 0.689 |
| **Latent Intercepts** | | | | |
| Intercept | 10.11(0.19) | < 0.001 | 10.11(0.19) | < 0.001 |
| Linear coefficient | 0.98(0.19) | < 0.001 | 3.05(0.69) | < 0.001 |
| Quadratic coefficient | -0.22(0.05) | < 0.001 | -0.88(0.20) | < 0.001 |
| **Latent Variances** | | | | |
| Intercept | 20.76(2.55) | < 0.001 | 20.76(2.55) | < 0.001 |
| Linear coefficient | 7.07(2.96) | 0.017 | 7.07(2.96) | 0.017 |
| Quadratic coefficient | 0.53(0.19) | 0.005 | 0.53(0.19) | 0.005 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -0.23(2.70) | 0.932 | -0.23(2.70) | 0.932 |
| Intercept w/Quadratic coefficient | -0.37(0.66) | 0.57 | -0.37(0.66) | 0.57 |
| Linear coefficient w/Quadratic coefficient | -1.61(0.69) | 0.019 | -1.43(0.70) | 0.041 |
| **Fit Indices** | | | | |
| χ2 | 39.42(12) | < 0.001 |  |  |
| CFI | 0.99 |  |  |  |
| RMSEA | 0.07 |  |  |  |

Table S6. Model fit statistics for model grouped by computer access (with covariates). Here the processes as in tables S2 and S4 are combined.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **No-change** |  | 52 | 17 744 | 17 915 | 214 |  |  |
| **No-change** | **Linear** |  | 38 | 17 650 | 17 886 | 91.2 | < 2.2 × 10-16 | \*\*\* |
| **Linear** | **Quadratic (0)** |  | 22 | 17 618 | 17 930 | 27.2 | 1.0 × 10-6 | \*\*\* |
| **0** | **1** | Residual variances | 26 | 17 613 | 17 906 | 30.3 | 0.59 |  |
| **1** | **2** | *y*-intercept | 27 | 17 612 | 17 900 | 30.8 | 0.55 |  |
| **2** | ***3*** | *Linear coefficient* | *28* | *17 620* | *17 904* | *41.5* | 7.2 × 10-4 | *\*\*\** |
| **2** | ***4*** | *Quadratic coefficient* | *28* | *17 621* | *17 905* | *42.7* | *0.0036* | *\*\** |
| **2** | **5** | *y*-intercept variance | 28 | 17 610 | 17 893 | 30.9 | 0.71 |  |
| **5** | **6** | Linear coefficient variance | 29 | 17 609 | 17 888 | 32.0 | 0.80 |  |
| **6** | **7** | Quadratic coefficient variance | 30 | 17 607 | 17 882 | 32.6 | 0.45 |  |
| **7** | **8** | *y*-intercept/linear coefficient covariance | 31 | 17 606 | 17 876 | 33.5 | 0.41 |  |
| **8** | **9** | *y*-intercept/quadratic coefficient covariance | 32 | 17 604 | 17 869 | 33.6 | 0.13 |  |
| **9** | **10** | Linear coefficient/quadratic coefficient covariance | 33 | 17 603 | 17 864 | 34.7 | 0.29 |  |

Table S7. Output for model grouped by computer access (with covariates, no weights applied).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Sex | 0.25(0.00) | < 0.001 | 0.21(0.03) | < 0.001 |
| Birth year | 0.07(0.00) | < 0.001 | 0.07(0.01) | < 0.001 |
| Dichotomised ethnicity | 0.20(0.01) | < 0.001 | 0.25(0.00) | < 0.001 |
| Mean monthly household income | 0.02(0.00) | < 0.001 | 0.03(0.01) | 0.022 |
| Main study wave 9 | 8.58(4.05) | 0.034 | 8.58(4.05) | 0.034 |
| COVID-19 wave 4 | 10.21(1.35) | < 0.001 | 10.21(1.35) | < 0.001 |
| COVID-19 wave 6 | 8.27(1.35) | < 0.001 | 8.27(1.35) | < 0.001 |
| COVID-19 wave 8 | 4.86(3.79) | 0.2 | 4.86(3.79) | 0.2 |
| **Latent Intercepts** | | | | |
| Intercept | 9.51(0.78) | < 0.001 | 9.51(0.78) | < 0.001 |
| Linear coefficient | 1.35(0.75) | 0.072 | 10.31(3.37) | 0.002 |
| Quadratic coefficient | -0.27(0.20) | 0.182 | -3.20(1.13) | 0.005 |
| **Latent Variances** | | | | |
| Intercept | 21.46(4.39) | < 0.001 | 21.46(4.39) | < 0.001 |
| Linear coefficient | 8.97(5.25) | 0.088 | 8.97(5.25) | 0.088 |
| Quadratic coefficient | 0.38(0.35) | 0.278 | 0.38(0.35) | 0.278 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -2.70(4.45) | 0.544 | -2.70(4.45) | 0.544 |
| Intercept w/Quadratic coefficient | 0.27(1.04) | 0.796 | 0.27(1.04) | 0.796 |
| Linear coefficient w/Quadratic coefficient | -1.67(1.26) | 0.185 | -1.67(1.26) | 0.185 |
| **Fit Indices** | | | | |
| χ2 | 34.72 |  |  |  |
| CFI | 1 |  |  |  |
| RMSEA | 0.01 |  |  |  |
| Scaled χ2 | 36.05(33) | 0.328 |  |  |

Table S8. Model fit statistics for model grouped by good internet connection access (no covariates). Processes identical to those in Table S6.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **0** |  | 2 | 15 926 | 16 048 | 1.78 |  |  |
| **0** | **1** | Residual variances | 6 | 15 921 | 16 025 | 5.51 | 0.56 |  |
| **1** | **2** | *y*-intercept | 7 | 15 920 | 16 019 | 5.76 | 0.61 |  |
| **2** | ***3*** | *Linear coefficient* | *8* | *15 921* | *16 016* | *9.36* | *0.034* | *\** |
| **2** | **4** | Quadratic coefficient | 8 | 15 920 | 16 015 | 8.39 | 0.080 |  |
| **4** | **5** | *y*-intercept variance | 9 | 15 919 | 16 009 | 8.97 | 0.44 |  |
| **5** | **6** | Linear coefficient variance | 10 | 15 917 | 16 002 | 8.97 | 0.99 |  |
| **6** | ***7*** | *Quadratic coefficient variance* | *11* | *15 918* | *15 998* | *11.8* | *0.044* | *\** |
| **6** | **8** | *y*-intercept/linear coefficient covariance | 11 | 15 915 | 15 995 | 9.18 | 0.62 |  |
| **8** | **9** | *y*-intercept/quadratic coefficient covariance | 12 | 15 915 | 15 991 | 11.5 | 0.12 |  |
| **9** | ***10*** | *Linear coefficient/quadratic coefficient covariance* | *13* | *15 922* | *15 993* | *19.9* | *5.9 × 10-4* | *\*\*\** |

Table S9. Output for model grouped by good internet connection access (no covariates, survey weights applied).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Main study wave 9 | 10.74(2.40) | < 0.001 | 10.74(2.40) | < 0.001 |
| COVID-19 wave 4 | 6.32(0.81) | < 0.001 | 6.32(0.81) | < 0.001 |
| COVID-19 wave 6 | 8.99(0.92) | < 0.001 | 8.99(0.92) | < 0.001 |
| COVID-19 wave 8 | 0.78(2.49) | 0.754 | 0.78(2.49) | 0.754 |
| **Latent Intercepts** | | | | |
| Intercept | 10.05(0.19) | < 0.001 | 10.05(0.19) | < 0.001 |
| Quadratic coefficient | -0.26(0.05) | < 0.001 | -0.26(0.05) | < 0.001 |
| Linear coefficient | 1.10(0.18) | < 0.001 | 1.22(0.28) | < 0.001 |
| **Latent Variances** | | | | |
| Intercept | 20.62(2.55) | < 0.001 | 20.62(2.55) | < 0.001 |
| Linear coefficient | 6.82(2.96) | 0.021 | 6.82(2.96) | 0.021 |
| Quadratic coefficient | 0.56(0.19) | 0.003 | 0.15(0.23) | 0.508 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -0.01(2.69) | 0.998 | -0.01(2.69) | 0.998 |
| Intercept w/Quadratic coefficient | -0.44(0.65) | 0.5 | -0.44(0.65) | 0.5 |
| Linear coefficient w/Quadratic coefficient | -1.62(0.69) | 0.019 | -0.75(0.73) | 0.302 |
| **Fit Indices** | | | | |
| χ2 | 49.42(12) | < 0.001 |  |  |
| CFI | 0.98 |  |  |  |
| RMSEA | 0.09 |  |  |  |

Table S10. Model fit statistics for model grouped by good internet connection access (with covariates). Processes identical to those in tables S6 and S8.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **No-change** |  | 52 | 17 771 | 17 941 | 206 |  |  |
| **No-change** | **Linear** |  | 38 | 17 672 | 17 908 | 78.6 | < 2.2 × 10-16 | \*\*\* |
| **Linear** | **Quadratic (0)** |  | 22 | 17 652 | 17 964 | 26.7 | 6.1 × 10-5 | \*\*\* |
| **0** | **1** | Residual variances | 26 | 17 647 | 17 940 | 29.8 | 0.65 |  |
| **1** | **2** | *y*-intercept | 27 | 17 646 | 17 934 | 30.8 | 0.26 |  |
| **2** | **3** | Linear coefficient | 28 | 17 645 | 17 929 | 31.7 | 0.33 |  |
| **3** | **4** | Quadratic coefficient | 29 | 17 644 | 17 923 | 32.6 | 0.47 |  |
| **4** | **5** | *y*-intercept variance | 30 | 17 642 | 17 917 | 33.2 | 0.55 |  |
| **5** | **6** | Linear coefficient variance | 31 | 17 640 | 17 910 | 33.3 | 0.78 |  |
| **6** | **7** | Quadratic coefficient variance | 32 | 17 642 | 17 907 | 36.7 | 0.062 |  |
| **7** | **8** | *y*-intercept/linear coefficient covariance | 33 | 17 640 | 17 900 | 36.7 | 0.99 |  |
| **8** | ***9*** | *y-intercept/quadratic coefficient covariance* | *34* | *17 646* | *17 902* | *45.3* | *0.015* | *\** |
| **8** | **10** | Linear coefficient/quadratic coefficient covariance | 34 | 17 641 | 17 897 | 40.3 | 0.22 |  |

Table S11. Output for model grouped by good internet connection access (with covariates, no weights applied).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Sex | 0.25(0.00) | < 0.001 | 0.23(0.01) | < 0.001 |
| Birth year | 0.07(0.00) | < 0.001 | 0.06(0.01) | < 0.001 |
| Dichotomised ethnicity | 0.20(0.01) | < 0.001 | 0.22(0.02) | < 0.001 |
| Mean monthly household income | 0.02(0.00) | < 0.001 | 0.02(0.01) | 0.028 |
| Main study wave 9 | 10.08(4.12) | 0.014 | 10.08(4.12) | 0.014 |
| COVID-19 wave 4 | 10.12(1.34) | < 0.001 | 10.12(1.34) | < 0.001 |
| COVID-19 wave 6 | 8.47(1.34) | < 0.001 | 8.47(1.34) | < 0.001 |
| COVID-19 wave 8 | 5.20(3.80) | 0.171 | 5.20(3.80) | 0.171 |
| **Latent Intercepts** | | | | |
| Intercept | 9.72(0.78) | < 0.001 | 9.72(0.78) | < 0.001 |
| Linear coefficient | 1.62(0.74) | 0.029 | 1.62(0.74) | 0.029 |
| Quadratic coefficient | -0.38(0.20) | 0.063 | -0.38(0.20) | 0.063 |
| **Latent Variances** | | | | |
| Intercept | 20.51(4.48) | < 0.001 | 20.51(4.48) | < 0.001 |
| Linear coefficient | 7.47(5.45) | 0.171 | 7.47(5.45) | 0.171 |
| Quadratic coefficient | 0.28(0.37) | 0.443 | 0.28(0.37) | 0.443 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -1.56(4.58) | 0.733 | -1.56(4.58) | 0.733 |
| Linear coefficient w/Quadratic coefficient | -1.31(1.32) | 0.323 | -1.31(1.32) | 0.323 |
| Intercept w/Quadratic coefficient | -0.05(1.08) | 0.962 | 0.75(1.15) | 0.511 |
| **Fit Indices** | | | | |
| χ2 | 40.29 |  |  |  |
| CFI | 1 |  |  |  |
| RMSEA | 0.02 |  |  |  |
| Scaled χ2 | 37.28(34) | 0.321 |  |  |

Table S12. Sensitivity check: model fit statistics for model grouped by computer access (no covariates, participants without CV8 longitudinal weight NOT excluded). Processes identical to those in tables S6, S8 and S10.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **No-change** |  | 52 | 26 311 | 26 500 | 299 |  |  |
| **No-change** | **Linear** |  | 38 | 26 177 | 26 440 | 137 | < 2.2 × 10-16 | \*\*\* |
| **Linear** | **Quadratic (0)** |  | 22 | 26 114 | 26‌ 461 | 41.9 | 2.5 × 10-12 | \*\*\* |
| **0** | **1** | Residual variances | 26 | 26 110 | 26 437 | 46.6 | 0.32 |  |
| **1** | **2** | *y*-intercept | 27 | 26 110 | 26 431 | 48.4 | 0.31 |  |
| **2** | ***3*** | *Linear coefficient* | *28* | *26 115* | *26‌ 431* | *55.5* | *0.0032* | *\*\** |
| **2** | ***4*** | *Quadratic coefficient* | *28* | *26 115* | *26‌ 431* | *55.7* | *0.0096* | *\*\** |
| **2** | **5** | *y*-intercept variance | 28 | 26 109 | 26 424 | 48.7 | 0.64 |  |
| **5** | **6** | Linear coefficient variance | 29 | 26 109 | 26 419 | 50.8 | 0.28 |  |
| **6** | **7** | Quadratic coefficient variance | 30 | 26 108 | 26 413 | 52.5 | 0.063 |  |
| **7** | **8** | *y*-intercept/linear coefficient covariance | 31 | 26 107 | 26 407 | 53.2 | 0.45 |  |
| **8** | **9** | *y*-intercept/quadratic coefficient covariance | 32 | 26 105 | 26 400 | 53.3 | 0.75 |  |
| **9** | **10** | Linear coefficient/quadratic coefficient covariance | 33 | 26 104 | 26 393 | 53.9 | 0.12 |  |

Table S13. Output for sensitivity check computer model with survey weights applied.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Sex | 0.25(0.00) | < 0.001 | 0.25(0.00) | < 0.001 |
| Birth year | 0.09(0.00) | < 0.001 | 0.10(0.01) | < 0.001 |
| Dichotomised ethnicity | 0.22(0.00) | < 0.001 | 0.25(0.00) | < 0.001 |
| Mean monthly household income | 0.02(0.00) | < 0.001 | 0.02(0.01) | 0.015 |
| Main study wave 9 | 11.05(3.62) | 0.002 | 11.05(3.62) | 0.002 |
| COVID-19 wave 4 | 9.93(1.08) | < 0.001 | 9.93(1.08) | < 0.001 |
| COVID-19 wave 6 | 8.28(1.10) | < 0.001 | 8.28(1.10) | < 0.001 |
| COVID-19 wave 8 | 4.71(3.44) | 0.171 | 4.71(3.44) | 0.171 |
| **Latent Intercepts** | | | | |
| Intercept | 10.20(0.64) | < 0.001 | 10.20(0.64) | < 0.001 |
| Linear coefficient | 1.20(0.64) | 0.061 | 6.33(2.26) | 0.005 |
| Quadratic coefficient | -0.22(0.19) | 0.225 | -2.13(0.86) | 0.013 |
| **Latent Variances** | | | | |
| Intercept | 21.87(3.73) | < 0.001 | 21.87(3.73) | < 0.001 |
| Linear coefficient | 7.61(4.63) | 0.1 | 7.61(4.63) | 0.1 |
| Quadratic coefficient | 0.33(0.33) | 0.329 | 0.33(0.33) | 0.329 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -1.39(3.84) | 0.718 | -1.39(3.84) | 0.718 |
| Intercept w/Quadratic coefficient | -0.05(0.93) | 0.955 | -0.05(0.93) | 0.955 |
| Linear coefficient w/Quadratic coefficient | -1.39(1.15) | 0.226 | -1.39(1.15) | 0.226 |
| **Fit Indices** | | | | |
| χ2 | 53.9 |  |  |  |
| CFI | 0.99 |  |  |  |
| RMSEA | 0.03 |  |  |  |
| Scaled χ2 | 53.96(33) | 0.012 |  |  |

Table S14. Sensitivity check: model fit statistics for model grouped by access to a good internet connection (no covariates, participants without CV8 longitudinal weight NOT excluded). Processes identical to those in tables S6, S8, S10 and S12.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Current favoured model** | **Model under test** | **Additional constraints** | **Degrees of freedom (df)** | **Akaike Information Criterion (AIC)** | **Bayesian Information Criterion (BIC)** |  | **LRT** ***p*-value** | **Significance (\* < 0.05**  **\*\* < 0.01**  **\*\*\* < 0.001)** |
|  | **No-change** |  | 52 | 26 324 | 26 514 | 289 |  |  |
| **No-change** | **Linear** |  | 38 | 26 191 | 26 454 | 127 | < 2.2 × 10-16 | \*\*\* |
| **Linear** | **Quadratic (0)** |  | 22 | 26 133 | 26 480 | 37.2 | 4.3 × 10-11 | \*\*\* |
| **0** | **1** | Residual variances | 26 | 26 128 | 26 455 | 41.2 | 0.53 |  |
| **1** | **2** | *y*-intercept | 27 | 26 126 | 26 447 | 41.2 | 0.96 |  |
| **2** | ***3*** | *Linear coefficient* | *28* | *26 129* | *26 445* | *45.8* | *0.042* | *\** |
| **2** | **4** | Quadratic coefficient | 28 | 26 129 | 26 445 | 45.7 | 0.089 |  |
| **4** | **5** | *y*-intercept variance | 29 | 26 127 | 26 437 | 45.8 | 0.74 |  |
| **5** | **6** | Linear coefficient variance | 30 | 26 125 | 26 430 | 45.8 | 0.89 |  |
| **6** | **7** | Quadratic coefficient variance | 31 | 26 127 | 26 426 | 49.2 | 0.067 |  |
| **7** | **8** | *y*-intercept/linear coefficient covariance | 32 | 26 125 | 26 419 | 49.6 | 0.55 |  |
| **8** | ***9*** | *y-intercept/quadratic coefficient covariance* | *33* | *26 130* | *26 419* | *56.5* | *0.039* | *\** |
| **8** | **10** | Linear coefficient/quadratic coefficient covariance | 33 | 26 126 | 26 415 | 52.4 | 0.28 |  |

Table S15. Output for sensitivity check internet model with survey weights applied.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **With access** | | **Without access** | |
|  | **Estimate(Std.Err.)** | **p** | **Estimate(Std.Err.)** | **p** |
| **Residual Variances** | | | | |
| Sex | 0.25(0.00) | < 0.001 | 0.25(0.00) | < 0.001 |
| Birth year | 0.09(0.00) | < 0.001 | 0.08(0.01) | < 0.001 |
| Dichotomised ethnicity | 0.22(0.00) | < 0.001 | 0.23(0.01) | < 0.001 |
| Mean monthly household income | 0.02(0.00) | < 0.001 | 0.02(0.01) | 0.003 |
| Main study wave 9 | 11.69(3.65) | 0.001 | 11.69(3.65) | 0.001 |
| COVID-19 wave 4 | 9.94(1.07) | < 0.001 | 9.94(1.07) | < 0.001 |
| COVID-19 wave 6 | 8.30(1.09) | < 0.001 | 8.30(1.09) | < 0.001 |
| COVID-19 wave 8 | 5.42(3.47) | 0.119 | 5.42(3.47) | 0.119 |
| **Latent Intercepts** | | | | |
| Intercept | 10.32(0.64) | < 0.001 | 10.32(0.64) | < 0.001 |
| Quadratic coefficient | -0.33(0.18) | 0.072 | -0.33(0.18) | 0.072 |
| Linear coefficient | 1.44(0.63) | 0.022 | 1.96(0.85) | 0.021 |
| **Latent Variances** | | | | |
| Intercept | 21.40(3.76) | < 0.001 | 21.40(3.76) | < 0.001 |
| Linear coefficient | 7.07(4.72) | 0.135 | 7.07(4.72) | 0.135 |
| Quadratic coefficient | 0.26(0.35) | 0.451 | 0.26(0.35) | 0.451 |
| **Latent Covariances** | | | | |
| Intercept w/Linear coefficient | -0.94(3.90) | 0.809 | -0.94(3.90) | 0.809 |
| Linear coefficient w/Quadratic coefficient | -1.22(1.18) | 0.302 | -1.22(1.18) | 0.302 |
| Intercept w/Quadratic coefficient | -0.22(0.95) | 0.818 | 0.45(1.02) | 0.656 |
| **Fit Indices** | | | | |
| χ2 | 52.44 |  |  |  |
| CFI | 0.99 |  |  |  |
| RMSEA | 0.03 |  |  |  |
| Scaled χ2 | 48.77(33) | 0.038 |  |  |